JAPANESE TRADE STUDIES

Special Industry Analysis
No. 3

LEAD

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Note.-

The present report is one of a number which were prepared during 1944 and 1945 for the Foreign Economic Administration by members of the staff of the United States Tariff Commission. Owing to the desire of the Foreign Economic Administration to obtain this material as promptly as possible, the reports were not reviewed by the Tariff Commission. All statements of fact or opinion in these reports are attributable to the individual staff members who prepared them. The reports were originally intended for confidential use of Government agencies, but are now being made public with the consent of the Foreign Economic Administration.

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FOREWORD

This is one of a series of Special Industry Analyses discussing from a commodity or individual industry point of view the outstanding items entering into the trade of Japan proper with its Empire and with foreign countries. These analyses are a part of a larger project which includes compilations (annotated) of the imports and exports of Japan proper by sources and destinations; surveys of certain of the colonial areas, emphasizing their Empire and foreign trade and post-war problems relating thereto; an over-all study of the trade of Japan proper; and a survey of Japan's shipbuilding industry and shipping services and requirements in the pre-war period. In all of the studies Manchuria has been included as an Empire area owing to the political, economic, and military dominance of Japan in that area, especially during the last decade.

Most of the data in these analyses were taken from official and semi-official Japanese sources. Not only have errors and inconsistencies frequently been detected within individual volumes, but many data from different sources supposedly reporting on the same subject are irreconcilable. It is very likely that large shipments of goods reportedly moving to Kwantung from Japan have been in large part merely transhipments destined for Manchuria. In addition, the data probably exclude large shipments of commodities made to and from Empire areas for military purposes.

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LEAD

Introduction and summary.

Lead has been mined in Japan for centuries, yet the country has never been an important producer of the metal because its ore deposits are for the most part of low grade, small, and widely distributed. Domestic requirements have been supplied largely by imports of pig lead from sources outside the Empire. From 1933 to 1936 the value of imports averaged about 19 million yen (5 million dollars) annually, amounting to only about 0.6 percent of the value of imports of all commodities. The export trade in finished lead products is relatively very small.

The annual average consumption of lead in Japan increased from about 58,000 metric tons during 1928-32 to 90,000 tons during 1933-36. It is thought that a substantial part of the amount consumed in the later period was used in preparation for war. Peacetime requirements of Japan proper, provided the country continues to have a metal industry, might total about 50,000 tons. If it is assumed that domestic production on a peacetime basis will be 5,000 tons a year, and supplies from Korea (about 1,400 tons a year) are cut off, imports from foreign countries would probably be necessary in the amount of 55,000 tons a year.

The leading world exporters of refined lead--Mexico, Australia, Canada, and Burma--together with the United States (the largest producer but a relatively small exporter) have supplied the bulk of the Japanese requirements. Limitation of imports into Japan, if determined upon, might, therefore, be provided for by agreement or by some form of import licensing. Such limitations might, if severe, involve the necessity for price controls and rationing within Japan.

It is not thought that the dismemberment of the Japanese Empire would have any effect on the lead industry or markets of Japan proper because Japan has depended on Empire sources (Korea) for less than 2 percent of its lead imports and because the exports of finished products, such as sheets and tubes, have been less than the imports of lead and have been a minor source of income.

Summary of production, imports, exports, and apparent consumption.

Table 1.- Lead: Summary of production, imports, exports, and apparent consumption, Japan proper and Karafuto, annual, 1928-39, average, 1928-32 and 1933-36

(In metric tons)

Year	Production	Imports 1/			Exports			Apparent consumption
		From Empire areas 2/	Other	Total	To Empire areas 2/	Other	Total	
1928	3,653	537	62,046	62,583	3,098	105	3,203	63,033
1929	3,374	365	60,623	60,988	3,928	69	3,997	60,545
1930	3,800	8	56,208	56,216	5,525	173	5,698	54,318
1931	4,070	96	53,793	53,889	3,128	98	3,226	54,733
1932	6,415	472	55,487	55,959	2,711	21	2,732	59,642
Average, 1928-32	4,262	296	57,631	57,927	3,678	93	3,771	58,418
1933	6,824	737	66,518	67,255	3,306	57	3,363	70,716
1934	7,039	1,099	94,015	95,114	5,055	69	5,124	97,029
1935	7,443	1,671	89,737	91,408	5,226	202	5,428	93,423
1936	8,883	2,543	85,279	97,822	5,705	279	5,984	100,721
Average, 1933-36	7,547	1,513	86,387	87,387	4,824	152	4,976	90,471
1937	10,200	6,261	66,362	72,623	3/	3/	3/	3/
1938	4/ 12,000	5,814	62,378	68,192	3/	3/	3/	3/
1939	4/ 12,000	5,801	92,800	98,601	3/	3/	3/	3/

1/ Imports include "lead other than ingots and slabs" in an amount not exceeding 2,000 tons in any year.

2/ "Imports from Empire Areas" include, where available, imports from Kwantung and Manchuria, plus exports from Formosa and Korea to Japan. "Exports to Empire Areas," include, where available, exports to Kwantung and Manchuria, plus imports into Formosa and Korea from Japan.

3/ Not available.

4/ Approximate production.

Source: Production--American Bureau of Metal Statistics; imports, 1928-36--Monthly and Annual Returns of Foreign Trade of Japan; imports, 1937-39--official export statistics of the supplying countries, of which Canada, Mexico, Burma, Australia, and Korea are the principal ones, as compiled by the Bureau of Mines; exports--Monthly and Annual Returns of the Foreign Trade of Japan; Trade of Shipping of Chosen; and Annual Returns of the Trade of Taiwan (Formosa).

Production.

Production of lead in Japan has increased steadily from about 3,400 metric tons in 1929 to an estimated 12,000 tons in 1939. A minor producer of lead, Japan ranked sixteenth among producers in 1937, having an output of 10,200 metric tons compared with the world total of 1,679,000 tons.

Lead is one of the less important mineral products of Japan, the output in 1935 being valued at about 2 million yen (about $575,000) compared with 270 million for coal, 56 million for gold, 53 million for copper, 24 million for pig iron and steel, and 18 million for silver.

A small amount of lead is obtained as a byproduct in the smelting of imported zinc ores.

Imports.

Most of the Japanese supply of lead is derived from imports of the metal in the form of pigs and slabs.

Table 2.- Lead (ingots and slabs): Imports into Japan proper and Karafuto, by principal sources, average, 1928-32 and 1933-36 1/

Country	Average 1928-32		Average 1933	
	Quantity	Value	Quantity	Value
	Metric tons	1,000 yen	Metric tons	1,000 yen
Total, all countries	57,520	11,800	86,821	19,242
Canada	26,959	5,774	36,650	7,914
United States	20,260	4,096	22,598	4,573
British India 2/	6,600	1,169	15,036	3,365
Australia	3,230	668	1,818	378
Mexico	3/ 210	40	10,479	2,960
All other	261	53	240	52

1/ Imports into Karafuto, if any, are included. Imports into Japan are not separately reported after 1936.
2/ Including Ceylon before 1934, and Burma.
3/ No imports from Mexico 1928-31; 1,052 tons in 1932.

Source: Annual and Monthly Returns of the Foreign Trade of Japan.

Table 3.- Crude lead: Exports from Korea to Japan, annual, 1928-39, average, 1928-32 and 1933-36

Year	Quantity	Value
	Metric tons	1,000 yen
1928	537	178
1929	363	117
1930	3	1
1931	96	32
1932	449	385
Average, 1928-32	290	143
1933	634	744
1934	1,065	1,151
1935	1,622	2,351
1936	2,435	2,946
Average, 1933-36	1,439	1,798
1937	5,183	6,409
1938	5,814	7,856
1939	5,801	7,607

Source: Tables of the Trade and Shipping of Korea.

The principal suppliers have been Canada and the United States, but large tonnages have come from British India (Burma), Mexico, and Australia (see table 2).

As a result of efforts to develop the lead deposits of Korea, exports of lead from that country to Japan increased from 634 metric tons in 1933 to almost 6,000 tons in each of the years 1938 and 1939, but even the larger amount provided less than 10 percent of Japanese requirements. Exports of crude lead from Korea to Japan, [1/] are shown in table 3. Imports from Manchuria have varied greatly from year to year, but have never been much more than 1,500 tons. Few imports of lead ore have been made for smelting in Japan.

Exports.

Exports of lead from Japan proper have been in the form of finished products such as plates, sheets, and tubes. From 1933 to 1936 they averaged about 5,000 metric tons a year of which almost two-thirds went to Formosa (Taiwan) and Korea and most of the remaining third to Kwantung. During this same period exports accounted for about 5 percent of the available supply (see table 1).

1/ Included in table 1 together with imports into Japan from Kwantung and Manchuria as "Imports from Empire Areas."

Consumption.

The apparent consumption of lead in Japan averaged about 58,000 metric tons in the period 1928-32. During the next 4 years average consumption increased about 55 percent, presumably largely because of conversion to a wartime economy.

It is estimated that the lead consumed in Japan in 1937 was used as follows:

Use	Percent of total
Lead pipe, lead-line iron pipe, and lead-covered cables	35
Pigments, including white and red lead	25
Sheet lead	15
Solder	10
Miscellaneous such as foil (tea lead), plumbers lead, seals, and storage battery plates	15
Total	100

Storage-battery plates are near the bottom of the list although in the United States that is one of the principal uses of lead.

Consumption in the United States during the war indicates that there is little difference between wartime and peacetime uses for lead, but that there may be considerable change in the relative quantities required for various purposes.

There is little substitution of other products for lead in most of its principal uses.

COPPER

Introduction and summary.

Unlike most other minerals, copper occurs within Japan 1/ in considerable quantities; the mining as well as the smelting and refining of copper have occupied an important place in the Japanese economy for many years. From 1933 to 1937 Japan produced about 75,000 tons of copper annually; this was, however, only about 4.5 percent of the world total.

Before the First World War Japan exported about 60 percent of the copper it produced. The war so stimulated the industrialization of the country that the copper industry was soon on an import basis; except for a few years (1930-32) during the world depression when large amounts were exported at the prevailing low price, imports continually increased, and by 1933-37 Japan was importing about 43 percent of the copper it consumed, mostly in the form of blister and scrap copper and fabricated shapes. In 1937 Japan began to import also large amounts of ore and concentrates for smelting and refining, at the same time considerably expanding its domestic smelter and refining capacity. As copper has numerous wartime uses, this enlarged capacity proved of real value in the development of a war economy. By 1940 production from domestic and imported ores and concentrates increased to 125,000 tons, and apparent consumption exceeded 200,000 tons.

Some copper has been obtained from colonial areas, especially Korea, where smelting and refining facilities have been developed, but the bulk of imports has come from foreign sources of supply; the dismemberment of the Empire will have no serious effects on the industry.

Before the military program of Japan entered upon its most active stage, the country was consuming about 75,000 tons of copper annually, and this probably approximates the peacetime requirements of Japan in the post-war era.

Since 1941 Japan may have been obtaining almost 110,000 tons of copper from mines within Japan proper. This is an amount believed to be considerably in excess of the quantity required to meet the peacetime needs of the country. It is also, however, smaller by far than the total amount of copper which Japan has been consuming in its present wartime activities, as large quantities were imported before the war from foreign nations and have been imported more recently from the colonies. It appears, therefore, that despite the existence of considerable quantities of copper in Japan proper, a prohibition on copper [illegible]

1/ Throughout this study, the term "Japan" is intended to include only Japan proper and Karafuto.

There are about 16 copper mines of major importance in the Japanese Empire, of which 12 are in the home islands. These mines are served by 8 smelters with an annual capacity of from 100,000 to 125,000 metric tons. Most of the smelters are located near a copper mine; for the most part, the refineries and fabricating plants are in Japan proper, in the industrial centers of Osaka or Yokohama.1/

Financial control of the industry is centered in the following companies: Mitsubishi Mining Co., Furukawa and Co., Sumitomo Mining Co., Nippon Mining Co., Fujita Mining and Smelting Co., and Showa Kogyo. All these concerns, except Showa Kogyo, are members of an association, the Suiyokai, which governs production, sales, and purchases for its members and exercises a virtual monopoly over the copper industry. Copper production in Formosa, Manchuria, and Korea is controlled by Japanese companies which are members of the Japanese combine.

Production.

Table 2 compares the production of copper in various Empire areas with that in Japan. In 1928-32, the colonies supplied approximately 7 percent of the copper produced in the Empire; during the next 5 years (1933-37) the proportion increased to 9 percent.

Since Japan entered World War II, it has expanded its domestic output of copper ore (in Japan proper) by operating high-cost mines, which, in pre-war competition with foreign copper, it had found too costly to operate.

The development of copper mines in all Empire areas has been fostered; these mines are managed as parts of the Japanese Copper Trust. The refinery at Seoul, Korea, has been enlarged; it now handles blister copper from Manchuria, as well as from Korea. The average production of blister copper (1938-1940) in these areas is shown in the following tabulation:

Area	Average production 1938-40 (Metric tons)
Korea	5,000
Formosa	4,000
Manchuria	1,500
Total	10,500

1/ One refinery is known to exist at Seoul, Korea, but it probably produces copper for use within Korea only.

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Table 4.- Copper, blister and refined, and fabricated shapes: Exports from Japan proper and Karafuto, annual, 1928-40, and averages, 1928-32 and 1933-37

(In metric tons)

Year	Empire areas: Formosa	Korea	Manchuria	Total	Foreign markets	Total exports
1928	411	1,316	1/	1,727	1,237	2,964
1929	491	1,455	1/	1,946	6,309	8,255
1930	539	1,454	1/	1,993	31,199	33,192
1931	1,027	1,239	1/	2,296	24,301	26,597
1932	2,003	681	2,856	5,540	17,582	23,122
Average, 1928-32	894	1,235	571	2,700	16,126	18,826
1933	980	887	3,530	5,397	3,112	8,509
1934	525	1,156	5,433	7,114	5,508	12,622
1935	736	2,310	3,237	6,283	11,533	17,816
1936	907	2,463	2,545	5,915	6,512	12,427
1937	2/ 1,000	2/ 3,000	2/ 8,700	2/ 12,700	3/	2/ 12,700
Average, 1933-37	2/ 829	2/ 1,963	2/ 4,689	2/ 7,482	2/ 5,333	2/ 12,814
1938	2/ 1,000	2/ 2,000	2/ 4,000	2/ 7,000	3/	7,000
1939	2/ 1,000	2/ 2,000	2/ 6,000	2/ 9,000	3/	9,000
1940	3/	3/	3/	3/	3/	3/

1/ Not reported.
2/ Approximate.
3/ Not available.
4/ Average 1933-36.

Source: Formosa, Annual Return of the Trade of Taiwan (Formosa), 1928-39; Korea, Tables of Trade and Shipping of Chosen, December issues, 1928-39; Manchuria, The Mineral Industry of the British Empire and Foreign Countries, foreign markets, official Japanese statistics.

In addition to this method of using slag for cement manufacture, the method of sintering lime with the slag is used for some of Japan's wartime cement. The advantage of the latter method is that slag replaces clay or shale, which would otherwise have to be separately produced for the purpose.

Under peacetime conditions blast-furnace slag is little used, owing largely to the expense of using it unless the blast furnaces and cement plants are in close proximity.

Another wartime development in the cement industry of Japan proper is the utilization of its rotary kilns and other equipment for such vital war uses as the production of iron, alumina, and lime required by the Chemical industry. 1/

Because of geographic factors and freight rates involved in serving civilian markets for cement after the war, it is believed that much of the wartime dislocation and diversification of the Japanese cement industry will end at that time. Attempts to utilize excess capacity, however, may lead the industry to retain some of its wartime shifts to products other than cement.

Imports.

As before indicated, imports of cement into Japan proper have been very small. In the decade ending with 1939 they averaged 6,500 tons annually, which is equivalent to about 0.15 and 0.80 percent, respectively, of production and exports 2/ in Japan proper for the same period. Over 98 percent of these imports were supplied by Kwantung Province. Available information indicates that intercompany conflict in connection with production quotas was an important factor contributing to these imports because cartel agreements regarding such quotas in Japan proper did not apply to plants in Kwantung until 1937. In 1938 and 1939 imports from that province averaged less than 75 tons annually and comprised virtually all of the imports entered.

Exports.

Japan proper is by far the most important exporter of cement to other Far Eastern countries, but does not serve other export markets to any marked extent. Cement has a very low value in relation to its weight; therefore, freight rates constitute an important element in competition and delivered cost. This circumstance and the world-wide abundance of limestone and clay, the principal raw materials used in making cement, have led many

1/ Details concerning this conversion, the switch in types of cement made and the widespread changes instituted by the Asano Co. in the operation of its plants are given in Japanese-Controlled Cement Industry, 1944.

2/ Exports in the table are those officially recorded and the Korean and Formosan imports from Japan proper.